Lumbar Spine Surgery: Indications & Outcomes

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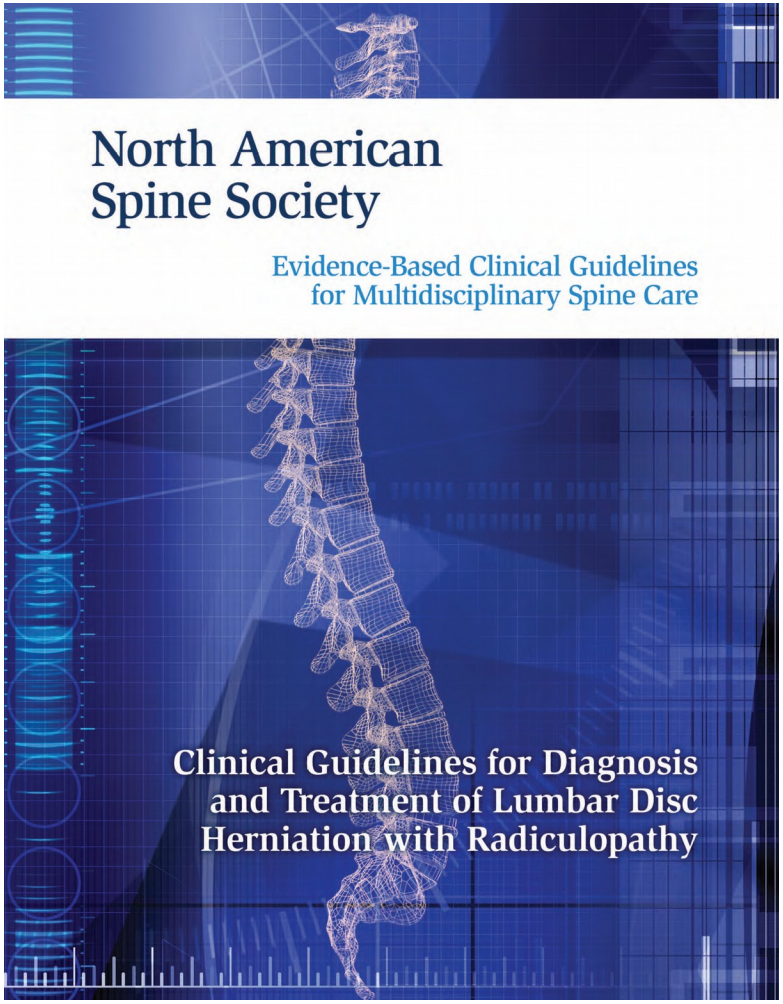
I have no financial or business relationships to disclose.

- Discuss the surgical management for common lumbar spine pathologies
- Literature based review of the expected clinical outcome after surgery
- Facilitate communication between referring providers and our clinic

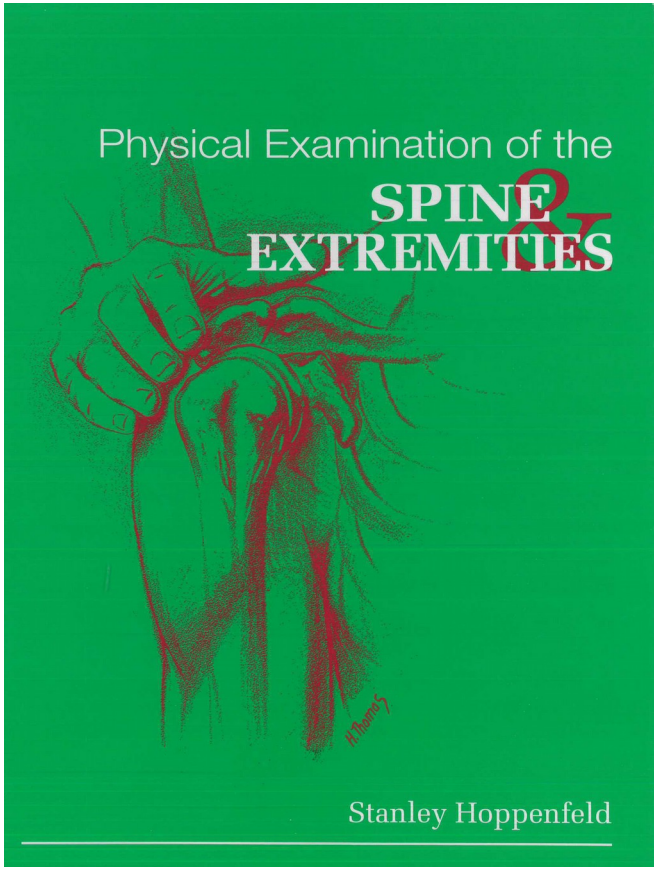

North American
Spine Society
Evidence-Based Clinical Guidelines
for Multidisciplinary Spine Care
Clinical Guidelines for Diagnosis
and Treatment of Lumbar Disc
Herniation with Radiculopathy

III. Definition and Natural History of Lumbar Disc Herniation with Radiculopathy

What is the best working definition of lumbar disc herniation with radiculopathy?

Localized displacement of disc material beyond the normal margins of the intervertebral disc space[1] resulting in pain, weakness or numbness in a myotomal or dermatomal distribution.

Work Group Consensus Statement


Physical Examination of the
SPINE &
EXTREMITIES
Stanley Hoppenfeld

PHYSICAL EXAMINATION OF THE LUMBAR SPINE

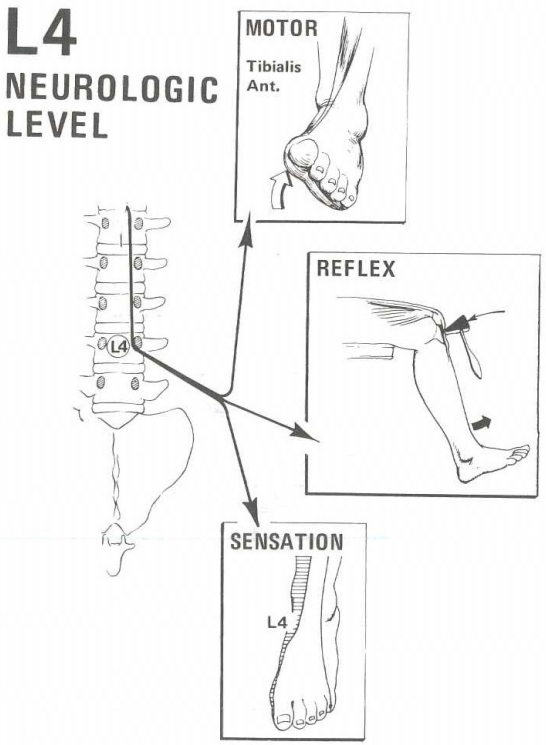


Fig. 30. Neurologic level L4.

PHYSICAL EXAMINATION OF THE LUMBAR SPINE

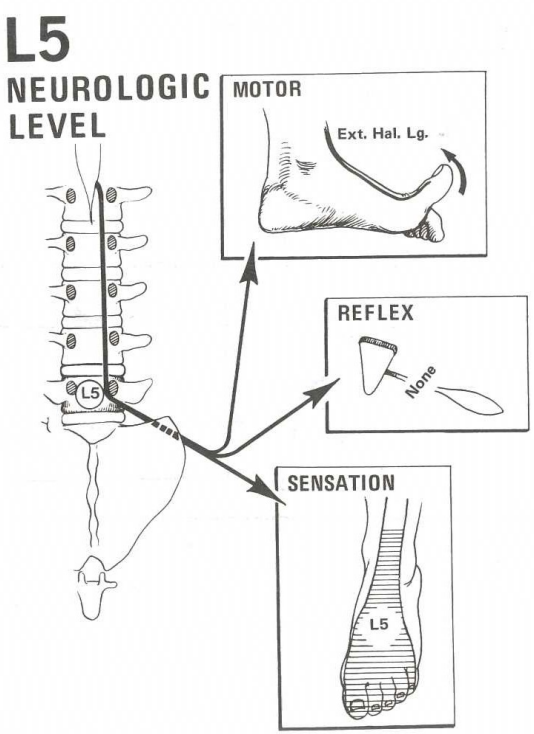


Fig. 31. Neurologic level L5.

PHYSICAL EXAMINATION OF THE LUMBAR SPINE

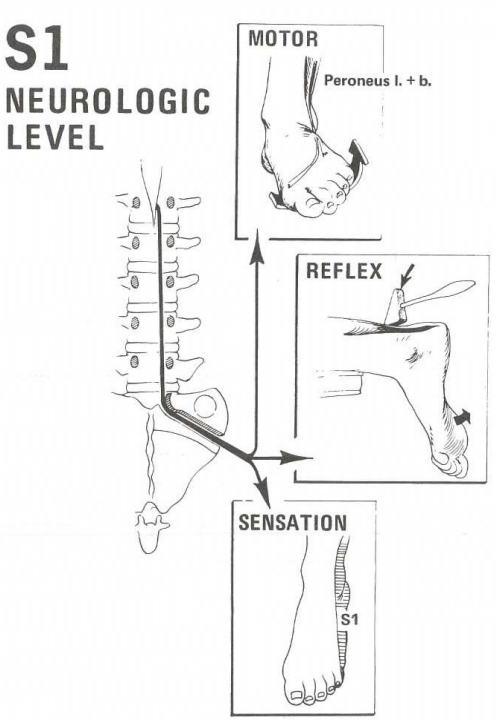
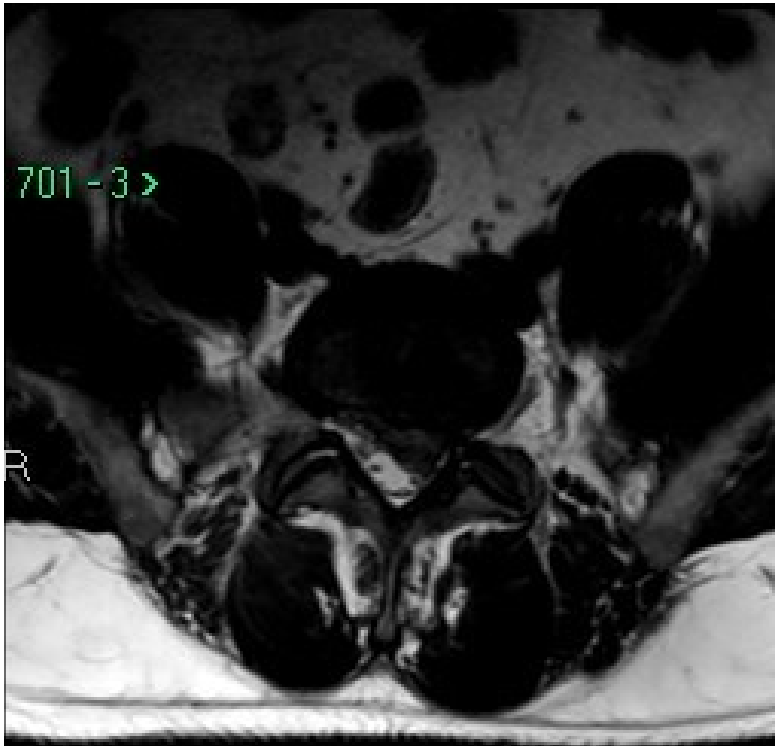


Fig. 32. Neurologic level S1.

- RH is a 42 year old male who initially presented with a CC of LBP radiating to the LLE
  - Localized to posterolateral left thigh ✉ posterior calf ✉ heel
  - No RLE complaints
  - No LE weakness
  - No bowel or bladder dysfunction
- ODI 66%, VAS back 7.3, VAS leg 7.9


701 - 3 >
R

L5-S1: There is a broadly based large posterior disc protrusion which is
central and left subarticular. Some extension into the foraminal zone is
also present with mild left neural foraminal narrowing. The left lateral
recess is obliterated. The left S1 nerve root is displaced posteriorly and
the ventral aspect of thecal sac is also a contour. Disc material closely
approximately disc material closely approximates the right S1 nerve root in
the lateral recess as well.

IMPRESSION:
Large left L5-S1 broad-based disc protrusion which is central and left

- Due to worsening of his symptoms, RH elected to not wait for 1st available anesthesia pain management appointment.

- Taken to surgery for left L5-S1 lumbar discectomy for the treatment of left S1 radiculopathy

	Preop	2 weeks	6 weeks
ODI	66%	56%	28%
VAS back	8.0	7.0	3.0
VAS leg	10	0	0

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The Outcomes of Lumbar Microdiscectomy in a Young, Active Population

Correlation by Herniation Type and Level

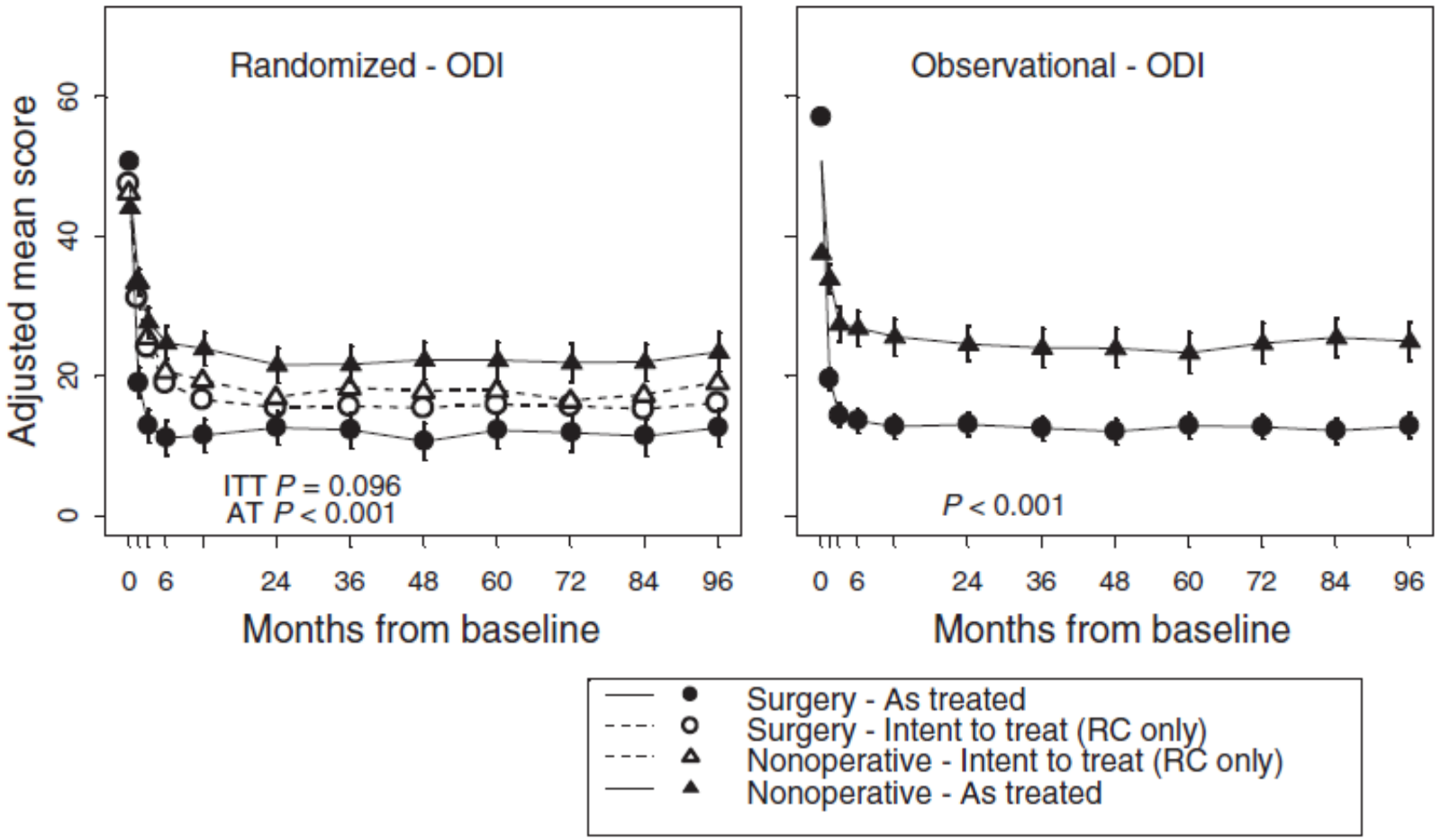
Christopher B. Dewing, MD, LCDR, MC, USNR,* Matthew T. Provencher, MD, LCDR, MC, USNR,*
Robert H. Riffenburgh, PhD,† Stewart Kerr, MD, LCDR, MC, USNR,*
and Richard E. Manos, MD, CDR, MC, USNR‡

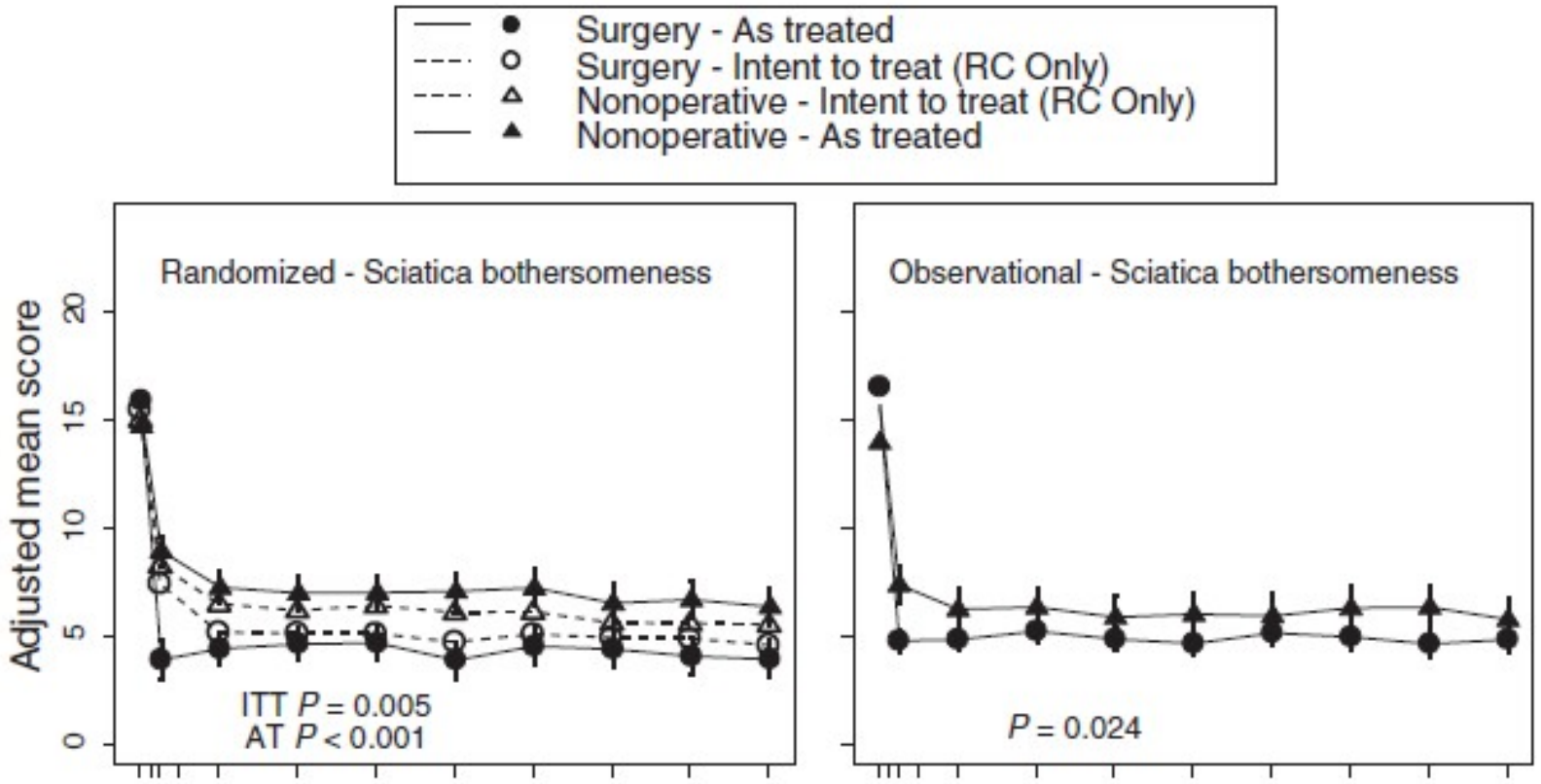
- Dewing et al – Spine 2008
- Case series of 197 patients who underwent lumbar discectomies for lumbar radiculopathy
  - Average f/u 26 months on 187 patients
  - ODI decreased by 32% (53% 🗸 21%)
  - VAS back decreased by 1.6 (4.30 🗸 2.70)
  - VAS leg decreased by 4.68 (7.17 🗸 2.49)
  - Return to active duty rate 84%

Surgical *Versus* Nonoperative Treatment for Lumbar Disc Herniation

Eight-Year Results for the Spine Patient Outcomes Research Trial

Jon D. Lurie, MD, MS,* Tor D. Tosteson, ScD,* Anna N. A. Tosteson, ScD,* Wenyan Zhao, PhD,* Tamara S. Morgan, MA,* William A. Abdu, MD, MS,* Harry Herkowitz, MD,† and James N. Weinstein, DO, MS*




Surgery - As treated
Surgery - Intent to treat (RC Only)
Nonoperative - Intent to treat (RC Only)
Nonoperative - As treated
Randomized - Sciatica bothersomeness
Observational - Sciatica bothersomeness
Adjusted mean score
0
5
10
15
20
ITT P = 0.005
AT P < 0.001
P = 0.024

- 44 year old female who presents with left drop foot
  - Upon heel strike with the left foot, her forefoot immediately slaps to the ground
  - 4/5 strength on left tibialis anterior and EHL

<5-8>
A
I

<5-7>
A
I

< 8 - 20 >
R
P

- FINDINGS: There is an epidural mass from the posterior aspect of the L5 vertebral body within the left paracentral region extending from the left lateral recess of L5. There is intermediate T1 and T2 signal with peripheral enhancement. There is obliteration of the left L5-S1 neural foramen and compression of the left L5 nerve root and the exiting portion in the neural foramen. There is posterolateral displacement of the thecal sac at L5.

- IMPRESSION: PERIPHERAL-ENHANCING MASS EXTENDING FROM THE LEFT L5 LATERAL RECESS INTO THE L5-S1 NEURAL FORAMEN CONSISTENT WITH SEQUESTERED DISK FRAGMENT.

- Lumbar discectomy is effective for the relief of:
  - Unilateral lower extremity radiating pain that corresponds to the nerve root compression on MRI
  - Unilateral lower extremity weakness that corresponds to the nerve root compression on MRI
- Lumbar discectomy is not effective for the relief of back pain alone
  - Dewing Spine 2008: VAS back decreased by 1.6

RESEARCH—HUMAN—CLINICAL STUDIES

Rate of Return to Military Active Duty After Single Level Lumbar Interbody Fusion: A 5-Year Retrospective Review

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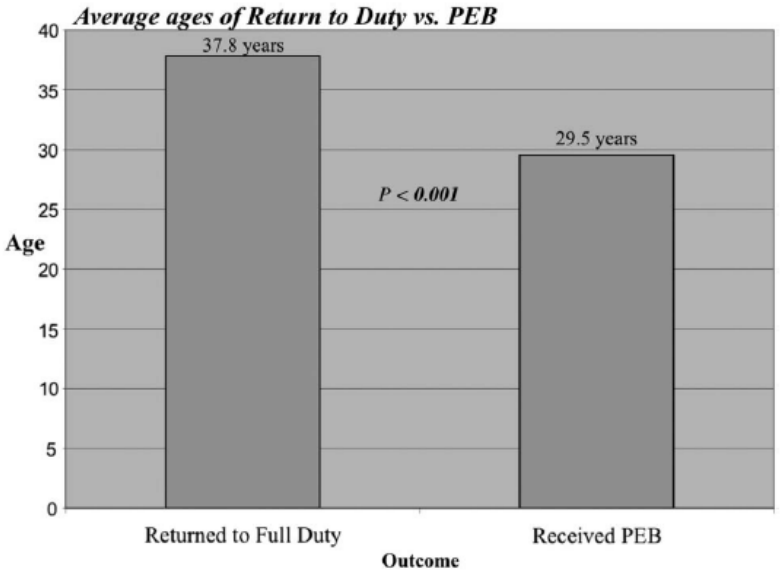
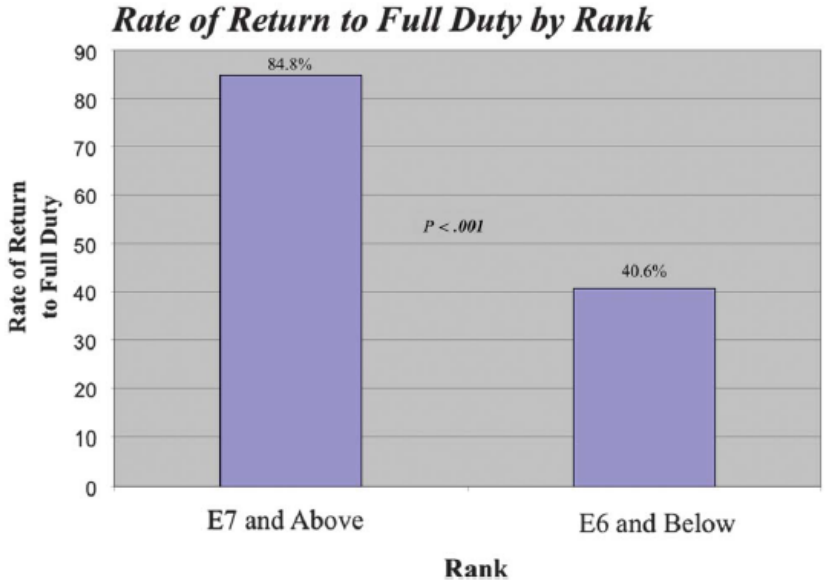
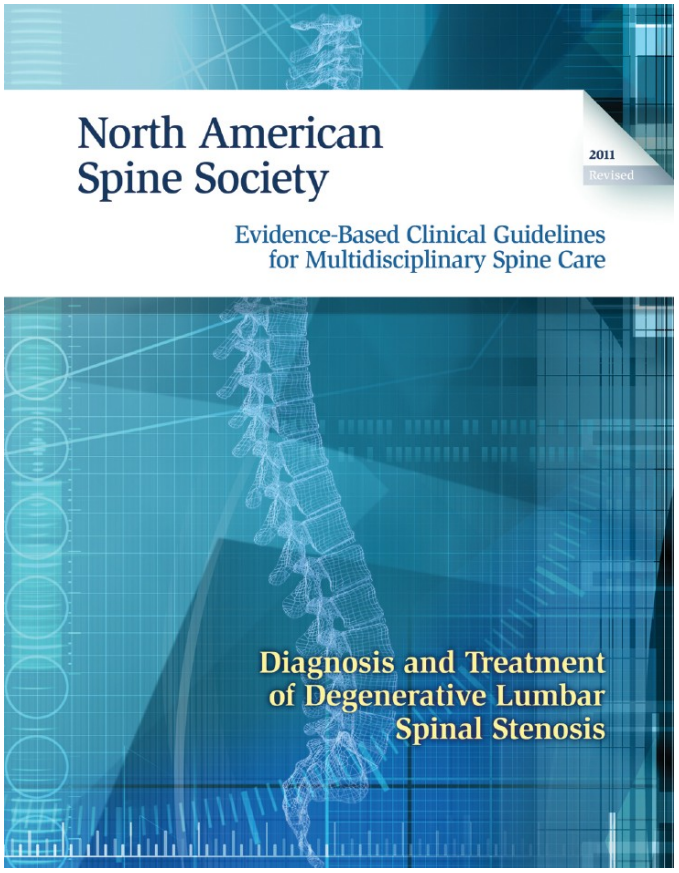
Rate of Return to Military Active Duty After Single Level Lumbar Interbody Fusion: A 5-Year Retrospective Review

- Retrospective review of 102 patients
  - Discogenic back pain (60)
  - Spondylolisthesis (40)
- 55% return to active duty rate






North American
Spine Society
2011
Revised
Evidence-Based Clinical Guidelines
for Multidisciplinary Spine Care
Diagnosis and Treatment
of Degenerative Lumbar
Spinal Stenosis

III. Definition and Natural History of Degenerative Lumbar Spinal Stenosis

What is the best working definition of degenerative lumbar spinal stenosis?

Degenerative lumbar spinal stenosis describes a condition in which there is diminished space available for the neural and vascular elements in the lumbar spine secondary to degenerative changes in the spinal canal. When symptomatic, this causes a variable clinical syndrome of gluteal and/or lower extremity pain and/or fatigue which may occur with or without back pain. Symptomatic lumbar spinal stenosis has certain characteristic provocative and palliative features. Provocative features include upright exercise such as walking or positionally-induced neurogenic claudication. Palliative features commonly include symptomatic relief with forward flexion, sitting and/or recumbency.

Work Group Consensus Statement

What are the most appropriate historical and physical findings consistent with the diagnosis of degenerative lumbar spinal stenosis?

The diagnosis of lumbar spinal stenosis may be considered in older patients presenting with a history of gluteal or lower extremity symptoms exacerbated by walking or standing which improves or resolves with sitting or bending forward. Patients whose pain is not made worse with walking have a low likelihood of stenosis.

Grade of Recommendation: C

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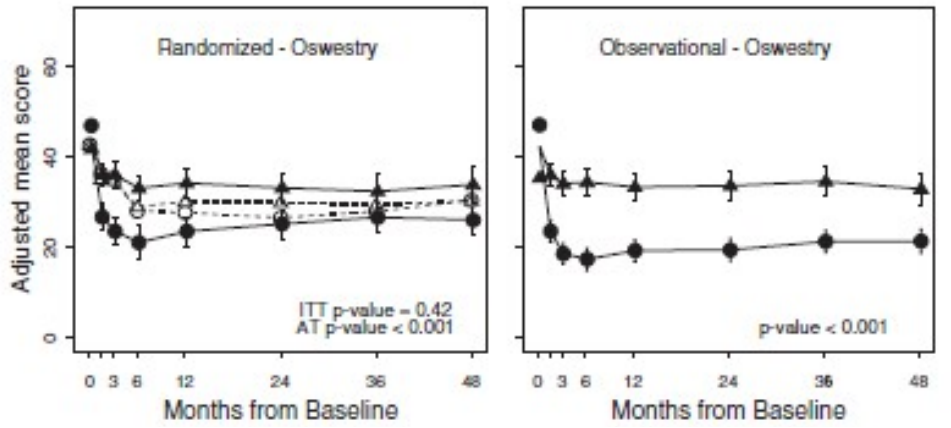
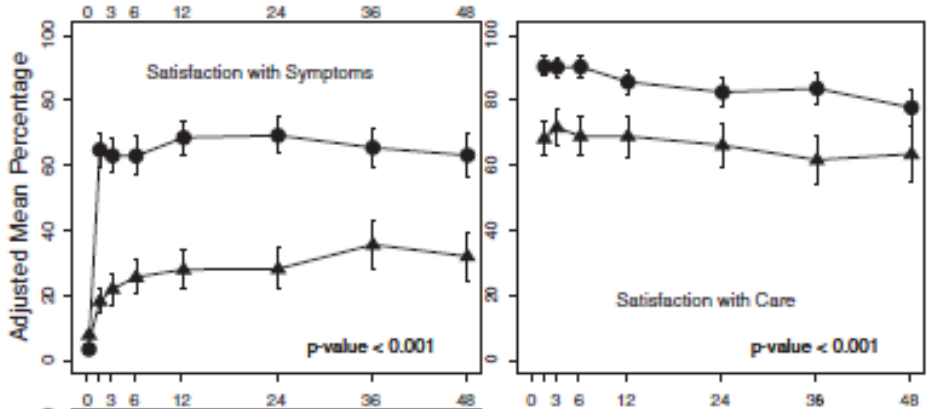
Surgical *Versus* Nonoperative Treatment for Lumbar Spinal Stenosis Four-Year Results of the Spine Patient Outcomes Research Trial

James N. Weinstein, DO, MS,*†‡ Tor D. Tosteson, ScD,*†‡ Jon D. Lurie, MD, MS,*†‡ Anna Tosteson, ScD,*†‡ Emily Blood, MS,*†‡ Harry Herkowitz, MD,§ Frank Cammisa, MD,¶ Todd Albert, MD,‖ Scott D. Boden, MD,** Alan Hilibrand, MD,‖ Harley Goldberg, DO,†† Sigurd Berven, MD,‡‡ and Howard An, MD§§





- Discectomy for lumbar radiculopathy can reduce leg pain and improve leg weakness
- Fusion for discogenic back pain is associated with a 55% return to active duty rate
  - May also be associated with adjacent level degeneration
- Decompression/laminectomy can reduce symptoms of neurogenic claudication from lumbar spinal stenosis
- Decompression/laminectomy + fusion can reduce symptoms of back and leg pain from degenerative spondylolisthesis

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Surgery for Low Back Pain

A Review of the Evidence for an American Pain Society Clinical Practice Guideline

Roger Chou, MD,*† Jamie Baisden, MD, FACS,‡ Eugene J. Carragee, MD,§ Daniel K. Resnick, MD,¶ William O. Shaffer, MD,‖ and John D. Loeser, MD**

Key Points

- For nonradicular low back pain with common degenerative changes, there is fair evidence from randomized trials that fusion is no more effective than intensive rehabilitation with a cognitive-behavioral emphasis, but slightly to moderately more effective than standard (nonintensive) nonsurgical therapy for improvement in pain and function.
- For radiculopathy with herniated lumbar disc, there is good evidence that open discectomy and microdiscectomy are moderately superior to nonsurgical therapy for improvement in pain and function through 2 to 3 months; evidence on longer-term benefits is inconsistent.
- For spinal stenosis with or without degenerative spondylolisthesis, there is good evidence that decompressive laminectomy (with or without fusion) is moderately superior to nonsurgical therapy for improvement in pain and function through 1 to 2 years.
- Although there is fair evidence that artificial disc replacement is as effective as fusion for nonradicular low back pain with single level degenerative disc disease and that an interspinous spacer device is moderately more effective than nonsurgical therapy for 1- or 2-level spinal stenosis, there is insufficient data to assess long-term benefits and harms.

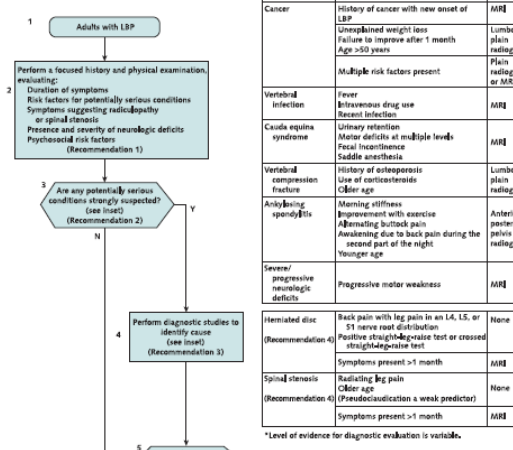
NMC Naval Med

CLINICAL GUIDELINES

Diagnosis and Treatment of Low Back Pain: A Joint Clinical Practice Guideline from the American College of Physicians and the American Pain Society

Roger Chou, MD; Amir Qaseem, MD, PhD, MHA; Vincenza Snow, MD; Donald Casey, MD, MPH, MBA; J. Thomas Cross Jr., MD, MPH; Paul Shekelle, MD, PhD; and Douglas K. Owens, MD, MS, for the Clinical Efficacy Assessment Subcommittee of the American College of Physicians and the American College of Physicians/American Pain Society Low Back Pain Guidelines Panel*

Figure 1. Initial evaluation of low back pain (*LBP*).

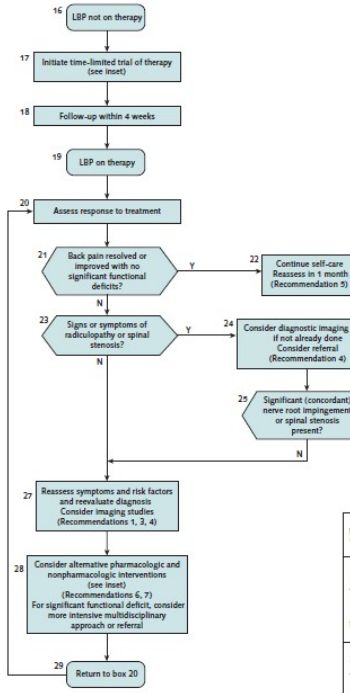

1 Adults with LBP
2 Perform a focused history and physical examination, evaluating:
Duration of symptoms
Risk factors for potentially serious conditions
Symptoms suggesting radiculopathy or spinal stenosis
Presence and severity of neurologic deficits
Psychosocial risk factors
(Recommendation 1)
3 Are any potentially serious conditions strongly suspected? (see inset) (Recommendation 2)
Y
N
4 Perform diagnostic studies to identify cause (see inset) (Recommendation 3)
5 Specific cause identified?
Y
N
6 Treat specific cause as indicated, consider consultation
7 Back pain is mild with no substantial functional impairment?
Y
8 Advise about self-care
Review indications for reassessment
(Recommendation 5)
N
9 Advise about self-care (Recommendation 5)
Discuss noninvasive treatment options:
Pharmacologic (Recommendation 6)
Nonpharmacologic (Recommendation 7)
10 Arrive at shared decision regarding therapy trial
Educate patient
11 Patient accepts risks and benefit of therapy?
Y
12 Patient on therapy?
Y
N
13 Go to Figure 2, box 19
14 Go to Figure 2, box 16
16 Continue self-care
Reassess in 1 month

Diagnostic Work-up

Possible cause	Key features on history or physical examination	Imaging*	Additional studies*
Cancer	History of cancer with new onset of LBP	MRI	ESR
	Unexplained weight loss Failure to improve after 1 month Age >50 years	Lumbosacral plain radiography	
	Multiple risk factors present	Plain radiography or MRI	
Vertebral infection	Fever Intravenous drug use Recent infection	MRI	ESR and/or CRP
Cauda equina syndrome	Urinary retention Motor deficits at multiple levels Fecal incontinence Saddle anesthesia	MRI	None
Vertebral compression fracture	History of osteoporosis Use of corticosteroids Older age	Lumbosacral plain radiography	None
Ankylosing spondylitis	Morning stiffness Improvement with exercise Alternating buttock pain Awakening due to back pain during the second part of the night Younger age	Anterior-posterior pelvis plain radiography	ESR and/or CRP, HLA-B27
Severe/ progressive neurologic deficits	Progressive motor weakness	MRI	Consider EMG/NCV
Herniated disc (Recommendation 4)	Back pain with leg pain in an L4, L5, or S1 nerve root distribution Positive straight-leg-raise test or crossed straight-leg-raise test	None	None
	Symptoms present >1 month	MRI	Consider EMG/NCV
Spinal stenosis (Recommendation 4)	Radiating leg pain Older age (Pseudoclaudication a weak predictor)	None	None
	Symptoms present >1 month	MRI	Consider EMG/NCV

*Level of evidence for diagnostic evaluation is variable.

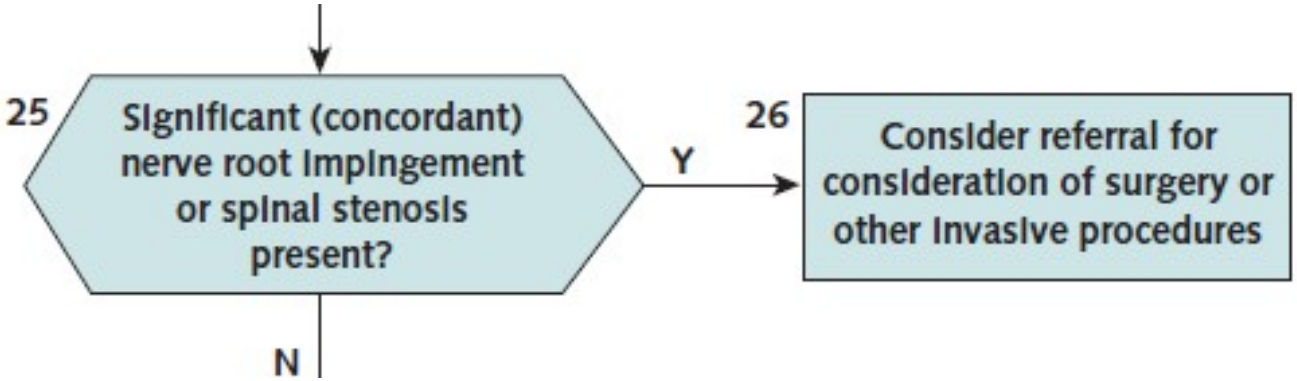
Figure 2. Management of low back pain (*LBP*).


16 LBP not on therapy
17 Initiate time-limited trial of therapy (see inset)
18 Follow-up within 4 weeks
19 LBP on therapy
20 Assess response to treatment
21 Back pain resolved or improved with no significant functional deficits?
Y
22 Continue self-care
Reassess in 1 month
(Recommendation 5)
N
23 Signs or symptoms of radiculopathy or spinal stenosis?
Y
24 Consider diagnostic imaging (MRI) if not already done
Consider referral
(Recommendation 4)
N
25 Significant (concordant) nerve root impingement or spinal stenosis present?
Y
26 Consider referral for consideration of surgery or other invasive procedures
N
27 Reassess symptoms and risk factors and reevaluate diagnosis
Consider imaging studies
(Recommendations 1, 3, 4)
28 Consider alternative pharmacologic and nonpharmacologic interventions (see inset)
(Recommendations 6, 7)
For significant functional deficit, consider more intensive multidisciplinary approach or referral
29 Return to box 20

Interventions (Recommendations 5, 6, 7)

	Low Back Pain Duration	Acute < 4 Weeks	Subacute or Chronic > 4 Weeks
Self-care	Advice to remain active	*	*
	Books, handout	*	*
	Application of superficial heat	*	
Pharmacologic therapy	Acetaminophen	*	*
	NSAIDs	*	*
	Skeletal muscle relaxants	*	
	Antidepressants (TCA)		*
	Benzodiazepines	*	*
	Tramadol, opioids	*	*
Nonpharmacologic therapy	Spinal manipulation	*	*
	Exercise therapy		*
	Massage		*
	Acupuncture		*
	Yoga		*
	Cognitive-behavioral therapy		*
	Progressive relaxation		*
	Intensive interdisciplinary rehabilitation		*

*Interventions supported by grade B evidence (at least fair-quality evidence of moderate benefit, or small benefit but no significant harms, costs, or burdens). No intervention was supported by grade A evidence (good-quality evidence of substantial benefit).


25
Significant (concordant) nerve root impingement or spinal stenosis present?
Y
26
Consider referral for consideration of surgery or other invasive procedures
N